CLAIMS

1. A parental artificial antigen presenting cell (AAPC) comprising a eukaryotic cell expressing β2-microglobulin and at least one exogenous accessory molecule.

2. An MHC-specific parental artificial antigen presenting cell (AAPC) comprising a eukaryotic cell expressing β2-microglobulin, at least one exogenous accessory molecule and a human leukocyte antigen (HLA) molecule of a single type.

3. An artificial antigen presenting cell (AAPC) comprising a eukaryotic cell expressing an antigen presenting complex comprising β2-microglobulin, at least one exogenous accessory molecule, a human leukocyte antigen (HLA) molecule of a single type and presenting at least one exogenous T cell-specific epitope.

4. The AAPC according to claim 1, 2 or 3 wherein the cell is selected from the group consisting of human, murine, rodentia, insect, or any other mammalian cells.

5. The AAPC according to claim 4, wherein the cell is human.

6. The AAPC according to claim 5, wherein the cell is autologous.

7. The AAPC according to claim 6, wherein the cell is non-autologous.

8. The AAPC according to claim 1, 2 or 3 wherein the cell is selected from the group consisting of fibroblast, T lymphocyte, tumor cell, transformed cell line, cell of hematopoietic origin, keratinocyte muscle cell or stromal cell.

9. The AAPC according to claim 8, wherein the cell is a fibroblast.

10. The AAPC according to claim 8, wherein the cell is a T lymphocyte.

11. The AAPC according to claim 1, 2 or 3, wherein the β2-microglobulin is endogenous.

12. The AAPC according to claim 1, 2 or 3, wherein the β2-microglobulin is exogenous.

13. The AAPC of claim 1, 2 or 3 wherein the β2-microglobulin is human β2-microglobulin.

14. The AAPC according to claim 1, 2 or 3 wherein the accessory molecule is selected from the group consisting of B7.1, B7.2, ICAM-1, LFA-3, CD40, CD40L, SLAM and 41BB ligand.

15. The AAPC according to claim 14, wherein the accessory molecule is B7.1.

16. The AAPC according to claim 14, wherein the accessory molecule is ICAM-1.

17. The AAPC according to claim 14, wherein the accessory molecules are B7.1 and ICAM-1.

18. The AAPC according to claim 2 or 3, wherein the HLA molecule is endogenous.

19. The AAPC according to claim 2 or 3, wherein the HLA molecule is exogenous.

20. The AAPC of claim 2 or 3 wherein the HLA molecule type is HLA-I.

21. The AAPC according to claim 20, wherein the HLA type is HLA-I and is selected from the group consisting of A2.1, or any other HLA A, B or C.

22. The AAPC according to claim 21, wherein the HLA molecule is A2.1.

23. The AAPC of claim 3 wherein the at least one exogenous T cell specific epitope comprises a plurality of antigens.

24. The AAPC according to claim 3, wherein the T cell-specific epitope is derived from a peptide specific to a tumor cell, a bacterial cell, a virus, a parasite or a normal human cell.

25. The AAPC according to claim 3, wherein the T cell-specific epitope is derived from a peptide that is a mutant or enhanced peptide derived from naturally occurring peptide specific to a tumor cell, a bacterial cell, a virus, a parasite or a normal human cell.

26. The AAPC according to claim 3, wherein the HLA is A1 and the T cell specific epitope is selected from the group consisting of YTSDYFISY, YLDDPDLKY, IADMGHLKY, STDHIPILY, DSDGSFFLY, ATDFKFAMY, YTAVVPLVY and YTDYGGLIFNSY.

27. The AAPC according to claim 3, wherein the HLA is A2.1 and the T cell specific epitope is selected from the group consisting of LLDVPTAAV, SLLPAIVEL, YLLPAIVEL, MVDGTLLLL, YMNGTMSQV, MLLSVPLLLG, LLLDVPTAAV, LLLDVPTAAVQA, and VLFRGGPRGLLAVA.

28. The AAPC according to claim 3, wherein the HLA is A11 and the T cell specific epitope is selected from the group consisting of SVLNLVIVK, KVVNPLFEK, RTQNVLGEK, ASFDKAKLK, and ATAGDGXXELRK.

29. The AAPC according to claim 3, wherein the HLA is A24 and the T cell specific epitope is selected from the group consisting of KYPNEFFLL, YYEEQHPEL, AYVHMVTHF, and VYXKHPVSX.

30. The AAPC according to claim 3, wherein the HLA is A68.1 and the T cell specific epitope is selected from the group consisting of DVFRDPALK, KTGGPIYKR, and TVFDAKRLIGR.

31. The AAPC according to claim 3, wherein the HLA is B7 and the T cell specific epitope is selected from the group consisting of APRTVALTA, APRTLVLLL, APRPPPKPM, SPRYIFTML, RPKSNIVLL, LVMAPRTVL, APRTVALTAL, and AASKERSGVSL.

32. The AAPC according to claim 3, wherein the HLA is B27 and the T cell specific epitope is selected from the group consisting of RRIKEIVKK, GRIDKPILK, RRSKEITVR, RRVKEVVKK, and RRYQKSTWL.

33. The AAPC according to claim 3, wherein the T cell-specific epitope is selected from the group consisting of influenza matrix, Mart-1, gp100, LMP-1, Wt-1, acid phosphatase, Her-2/neu and telomerase.

34. The AAPC according to claim 1, 2 or 3, wherein the β2-microglobulin and the accessory molecule are expressed from genes introduced into the cell by a recombinant virus.

35. The AAPC according to claim 1, 2 or 3, wherein the β2-microglobulin and the accessory molecule and the HLA molecule are expressed from genes introduced into the cell by a recombinant virus.

36. The AAPC according to claim 3, wherein the β2-microglobulin and the accessory molecule, the HLA molecule and the T cell specific epitope are expressed from genes introduced into the cell by a recombinant virus.

37. The AAPC according to claim 3, wherein the β2-microglobulin and the accessory molecule, the HLA molecule and the protein encoding the T cell specific epitope are expressed from genes introduced into the cell by a recombinant virus.

38. The AAPC according to claim 3, wherein the β2-microglobulin and the accessory molecule and the HLA molecule are expressed from genes introduced into the cell by a recombinant virus and the T cell specific epitope is loaded onto the cell.

39. The AAPC according to claim 1, 2 or 3 further comprising mutations that decrease endogenous peptide transport.

40. The AAPC according to claim 3, wherein the antigen presenting complex is effective in activating cytotoxic T cells.

41. A method of activating cytotoxic T lymphocytes (CTLs) comprising the steps of:

a) obtaining an AAPC according to claim 3;

b) obtaining a suitable population of T lymphocytes;

c) contacting the AAPC with the population of T lymphocytes under conditions suitable for T lymphocyte activation; and

d) isolating the activated CTLs.

42. The method according to claim 41, further comprising the step of:

e) restimulating the CTLs by contacting a second time with the AAPC.

43. A composition comprising the CTLs obtained by the method according to claim 41.

44. A composition comprising the CTLs obtained by the method according to claim 42.

45. A method of treating a patient in need thereof comprising administering an effective amount of any one of the compositions according to claim 3.

46. A method of treating a patient in need thereof comprising administering an effective amount of the activated CTLs from the method of claim 41.

47. A method of treating a patient in need thereof comprising administering an effective amount of the activated CTLs from the method of claim 42.

48. A method of screening for accessory molecules comprising the steps of:

a) obtaining an AAPC according to claim 3;

b) expressing genes encoding potential accessory molecules in the AAPC;

c) obtaining a control AAPC that is the same as b) but does not express potential accessory molecules;

d) obtaining a suitable population of T lymphocytes;

e) contacting the T lymphocytes with the AAPC of b) under conditions suitable for activating T lymphocytes;

f) contacting the T lymphocytes with the AAPC of c) under conditions suitable for activating T lymphocytes; and

g) comparing the activation of the T lymphocytes from e) to the activation of the T lymphocytes from f);

wherein, if the activation of the T lymphocytes from e) is greater than that of the T lymphocytes of f), the potential accessory molecule is designated an accessory molecule.

49. A method of screening for T cell-specific antigens comprising the steps of:

a) obtaining an AAPC according to claim 2;

b) allowing the cells of a) to present potential T cell specific antigens;

c) obtaining a control AAPC that is the same as b) but does not present potential T cell specific antigens;

d) obtaining a suitable population of T lymphocytes;

e) contacting the T lymphocytes with the AAPC of b) under conditions suitable for activating T lymphocytes;

f) contacting the T lymphocytes with the AAPC of c) under conditions suitable for activating T lymphocytes; and

g) comparing the activation of the T lymphocytes from e) to the activation of the T lymphocytes from f);

wherein, if the activation of the T lymphocytes from e) is greater than that of the T lymphocytes of f), the potential T cell specific antigens is designated a T cell specific antigen.

50. The method according to claim 49, wherein the potential T cell specific epitope is expressed from a gene introduced into the cell by a recombinant virus.

51. The AAPC according to claim 49, wherein the potential T cell specific epitope is loaded onto the cell.

52. The AAPC according to claim 49, wherein the potential T cell specific epitope is produced by recombinatorial chemistry.

53. The AAPC according to claim 49, wherein the potential T cell specific epitope is produced by a phage display library.

54. A method of identifying, within a test population of cytotoxic T lymphocytes (CTLs), CTLs specifically activated against a known T cell antigen comprising the steps of:

a) obtaining an AAPC according to claim 3;

b) allowing the AAPC to present the known T cell antigen;

c) obtaining a control AAPC that is the same as b) but does not present the known T cell antigen;

d) obtaining the test population of T lymphocytes;

e) contacting the test population of T lymphocytes with the AAPC of b) under conditions suitable for activating T lymphocytes;

f) contacting the T lymphocytes with the AAPC of c) under conditions suitable for activating T lymphocytes; and

g) comparing the activation of the T lymphocytes from e) to the activation of the T lymphocytes from f);

wherein, if the activation of the T lymphocytes from e) is greater than that of the T lymphocytes of f), the potential accessory molecule is designated an accessory molecule.

55. The method according to claim 54, wherein the known T cell specific epitope is expressed from a gene introduced into the cell by a recombinant virus.

56. The AAPC according to claim 54, wherein the known T cell specific epitope is loaded onto the cell.

57. The method according to claim 54, wherein identification is by measuring cytokine secretion.

58. The method according to claim 57, wherein the cytokine is selected from the group consisting of IFN-γ, IL-4, IL-10 or TNF.

59. The method according to claim 57, wherein cytokine secretion is measured by immunologic methods.

60. The method according to claim 54, wherein activation is measured by a T cell surface marker.

61. The method according to claim 60, wherein the T cell surface marker is an activation marker.

62. The method according to claim 61, wherein the activation marker is selected from the group consisting of CD69, IL-2 receptor and IL-15 receptor.

63. The method according to claim 60, wherein the T cell surface marker is an effector molecule.

64. The method according to claim 63, wherein the effector molecule is selected from the group consisting of FasL and trail.

65. The method according to claim 54, further comprising the step of measuring the proportion of activated CTLs in the test population of CTLs.

66. The method according to claim 54 or 65, wherein the identifying or measuring is for diagnostic purposes.